of the last-named country it is a special favourite. The German carp (*Cyprinus carpio*) has, through the efforts of Prof. Baird, been scattered broadcast over the United States, and in the warmer regions grows with surprising rapidity, attaining a weight more than double that of fish of the same age in their native waters. Eggs of the California salmon (*Salmo quinnat*) have been successfully transported from the United States to nearly all of the European countries. Though the species has always been considered a sea-going salmon, the fry hatched from the eggs sent to the Netherlands have been kept in freshwater ponds, where they have matured and spawned, the young produced from the eggs being as healthy as those hatched in California. These thrive better when confined in freshwater ponds than the native salmon (*Salmo salar*) under the same conditions, and fish-culturists of that country consider them better suited to their inland waters than any of the native Salmonidæ. It seems probable, from these experiments and from those with other species, that it will be possible to raise any of the Salmonidæ in fresh water.

The exhibits show the fish-cultural apparatus of many countries to be very primitive, and the hatching operations to be limited to a few species of Salmonidæ. The Exhibition cannot fail to advance the interests of fish culture in general, for it will open the eyes of the people to the fact that other species besides salmon and trout are worthy of attention, and can be hatched in enormous quantities without difficulty. Another important result of the Exhibition will doubtless be to convince the people of the value of fish culture as a means for increasing the food supply. It is indeed fortunate for the future of the science that so deep and widespread an interest has been awakened in the subject, for several papers calling in question the results of fish culture have recently made their appearance, and it requires the testimony of the leading authorities to counteract their influence. The testimony is just what might have been expected, and shows that in those countries where the operations have been most extensive confidence is strongest, and in those where work has been limited many question its practicability. Thus in both Sweden and Norway, where only a few thousand fry at most are placed in any stream, many of the hatcheries that formerly existed have ceased to operate, as no immediate results of their work could be seen. The same is true of other localities where the work has been carried on, to a limited extent only, by private parties; but where extensive hatching operations have been continued through a long period, the beneficial results are invariably acknowledged. Some, who are obliged to acknowledge the value of fish culture in cases where the fry are retained in ponds from which they cannot escape, question its result when the fish are turned out into waters tributary to the sea; these forget that the number of fry turned out by the wash-tub fish-culturists of many countries is so limited when compared with the entire number of fish in a stream, as to have no appreciable effect upon the fisheries. They also forget that, though owing to extensive operations considerable increase in the fisheries of a given locality may be noticeable in three or four years, the full results of artificial propagation cannot be expected until the fry of the artificially-hatched fish have developed into full-grown specimens and returned to the rivers to deposit their eggs. This would require from seven to eight years, as the second generation of any sea-going species can scarcely be expected to return before that period has elapsed. Canada and the United States are the only countries where public fish culture has been conducted on a large scale for a sufficient period to warrant a reliable verdict as to the importance of the work; and in both of these countries public opinion is decidedly in favour of continuing the work, and on a larger scale than ever before.

R. EDWARD EARLL

NOTES

WE regret to learn that M. Dumas has been confined to his bed for the last ten days, although his illness is not in itself serious.

PROF. CUNNINGHAM, of the Royal College of Surgeons, Ireland, has just been appointed to the Professorship of Anatomy in the University of Dublin, in succession to Prof. Macalister. The Professorship of Comparative Anatomy, also held by Dr. Macalister, is vacant, but will not be filled up until the meeting of the Academic Council in November or December next.

AN exhibition of electricity and electrical appliances will be held in Philadelphia, United States, commencing on Tuesday, September 2, 1884, under the auspices of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts. From the eminent reputation of this institution, coupled with the fact that the projected exhibition will be the first in America exclusively devoted to this important and progressing branch of science, this announcement has attracted unusual interest throughout the United States, and the exhibition will undoubtedly afford an admirable opportunity of witnessing a representative display of American discovery and invention in electricity. To increase its scientific and industrial importance, as well as to add to its attractiveness, it was determined shortly after its inception to give it an international character. The importance of the project having been properly represented to the Congress of the United States, an Act was passed to this effect, and articles intended for the exhibition will be admitted to the States free of duty. All applications should be made to the Secretary, Franklin Institute, Philadelphia, U.S.A.

THE Russian frigate *Minineh* has just started from the Baltic on a scientific voyage round the world. She has on board a number of Russian *savants* of every branch of science.

THE Prince of Wales is about to try the acclimatisation of the Norwegian ptarmigan at Abergeldie. Of sixty birds taken at Langöen in Nordland, twenty-two have just arrived at Bergen, the rest having died on the way.

THE Electric Railway from Portrush to the Giant's Causeway was opened last Friday by Earl Spencer, and among others present were Sir William Thomson, Sir William Siemens, and Sir Frederick Bramwell. It is over six miles long, and has cost 45,000*l*. The line, after passing through the principal street of Portrush, follows the seaside road, a portion of a footpath six feet broad being reserved for the railway. The gauge is only three feet, and the gradients are very steep—in places as much as one in thirty-five—and in parts of its course the curves are sharper than might have been desirable had the route which it takes been chosen by the engineers. The force to work it is generated by a waterfall in the River Bush, with an available head of twenty-four feet, the electric current being conveyed by an underground cable to the end of the tramway. The water power passing through turbine water-wheels, which utilise the whole force of the fall, is said to amount to ninety horse.

THE electrical omnibus devised by M. Philippart travelled last Sunday from the Place des Nations to Versailles. The distance is more than 20 kilometres. The experiment was successful, the only incident being a short stoppage occasioned, it appears, by the heating of a coil owing to an excess of current.

ADVICES from Colombo, under date of August 30, state that on the evening of August 27, at about 5.30, an extraordinary occurrence took place in Colombo Harbour. The sea suddenly subsided about six feet, receding from ten feet to fifteen feet, and owing to the velocity of the outward current the stern moorings of several large vessels gave way. The tide continued to rise and

fall until about six o'clock, when everything resumed its normal condition. The occurrence is attributed to the volcanic eruption at the Straits of Sunda.

THE Municipal Council of Paris having passed a resolution to lower the price of gas, the Gas Company has resisted, and a scientific commission has been appointed to decide whether the gas industry has so advanced as to justify a diminution in the price of the commodity. This commission has begun its work, which is to be terminated in a specified time, and it is surmised that the decision will be in favour of the claims of the City of Paris. The report, which will bear upon the whole of the gas industry, history, and actual state, will be at all events exceedingly interesting.

SEVERAL shocks of earthquake were felt in Agram on Tuesday night and early on Wednesday morning last week. Fortunately, the phenomenon was unattended by consequences more serious than the usual earth tremors and subterranean rumblings.

THE discussion of 1600 cases of aurora borealis observed during fifteen years at Godhaab has led M. Tromholt (NATURE, vol. xxvi. p. 130) to the conclusion that, however subject to the law of periodicity of 11·11 years, the periods of frequency at Godhaab are precisely the inverse of what has been observed under lower latitudes. The same holds good with regard to the annual and diurnal periods of frequency. Prof. Lenz, in the *Izvestia* of the Russian Geographical Society, makes an attempt to explain this circumstance by assuming that the zone of auroras (the "Nordlichtgurtel" of Weyprecht) is subject to a system of oscillations. In consequence of these it is slowly displaced towards the north, and when it has reached its most northern position a maximum of auroras is observed at Godhaab and in North Greenland, and a minimum in lower latitudes. The duration of this oscillation is the same as that of the frequency of spots on the sun, the minimum of these last corresponding to a maximum of auroras at Godhaab. The zone of auroras has also an annual period of oscillations; it seems to advance towards the north during the winter, and returns south during the summer (seeming thus to depend on temperature), as also a diurnal period of still smaller oscillations, in consequence of which it seems to be displaced towards the north during the early hours of the day. As to the cause of the connection between the auroras and sun-spots, it still remains unknown. Prof. Lenz points out, however, that it results from an analysis of the magnetic storm of January 31, 1881, that the cause of this storm was not a change in the intensity of the earth's magnetism, but merely a displacement of the region where the origin of magnetic storms must be sought for, and which probably is the zone of auroras. This zone would be submitted thus, on Prof. Lenz's hypothesis, to perturbations which appear either under the shape of auroras or as electrical currents. But might not all the phenomena mentioned be explained as well by the oscillations of Nordenskjöld's corona of auroras, and by variations in its luminous intensity produced by cosmical and telluric causes?

M. POTYLITZIN, who has submitted the waters that accompany naphtha, or are ejected by the mud volcanoes of the Caucasus, to a thorough chemical investigation, has found that they belong to two different groups. Those of the Caspian region are acid and contain almost exclusively chlorides of metals, whilst those of the north-western and southern naphtha regions of the Caucasus contain, besides a large amount of chloride of natrium, also carbonate of natrium, as well as iodine and salts of fatty acids. The presence of bromides and of iodine in these last must be probably explained by their washing out marine deposits of the Eocene, or, may be, of the Cretaceous period, which contain masses of marine organisms. Accepting Prof. Mendeléeff's theory as to the origin of naphtha, the author points out that, its primary seat being probably at a great depth, it impregnates, in consequence of its capillarity, the upper schists; but the water that continually descends from the surface down to the lower schists opposes this ascending motion of the naphtha, and a continuous struggle of both is the consequence of the two opposed movements, resulting in oscillations of the level of naphtha and of its discharge. Thus, at the Groznaya wells the amount of extracted naphtha diminishes from 54,000 gallons in the summer to 32,000 in the winter and spring, whilst at the much deeper (343 feet) well of Paolovsk the reverse is observed, the amount of extracted naptha being from 40,000 to 48,000 gallons in the winter, and only 32,000 gallons in the summer. This circumstance could be easily explained by the retardation which the water experiences in its descent to a greater depth.

THE Statistical Society announces as the subject for the Howard Medal for 1884—"The Preservation of Health, as it is affected by Personal Habits, such as Cleanliness, Temperance, &c."

RAPIDLY as new periodicals and societies with their journals and transactions are started in these days, they do not appear by a column of titles a week as books do. The Mason Science College of Birmingham, accordingly, thinks it not premature to print a first catalogue of about 6000 volumes of these most important publications—British and foreign—which in little more than two years have come into its possession. Such papers form the most fundamental literature of all science, and the wide range of subjects upon which they treat and the completeness of the series of many of those now belonging to the Mason College, will be appreciated by the student for whose service they have been brought together by this noble institution, or by any one who compares this catalogue of them with those of many other collections.

WE are informed that the ships *Dacia* and *International*, used in the expedition which is accompanied by Mr. J. Y. Buchanan, do not belong to the Telegraph Construction Company, but are the property of the Indiarubber, Guttapercha, and Telegraph Works Company, which is engaged in the work of laying the cables from Cadiz to the Canaries, and thence to Senegal, for the Spanish and French Governments.

MR. SCOTT SNELL has made some very interesting experiments on the use of asbestos paint for coating Jablochkoff candles; he finds that with pure asbestos paint the arc is much steadier and the carbons last much longer.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus radiatus* ♀) from India, presented by the Rev. G. R. Roberts; a White-fronted Capuchin (*Cebus albifrons* ♂) from South America, presented by Capt. King; a Blotched Genet (*Genetta tigrina*), a Long-nosed Crocodile (*Crocodilus cataphractus*) from West Africa, presented by Surgeon Mosse, A.M.D.; an Egyptian Cat (*Felis chaus*) from North Africa, presented by Lieut.-Col. Mitchell Taylor; two Kittiwake Gulls (*Rissa tridactyla*), a Common Guillemot (*Uria troile*), British, presented by Mr. Cuninghame; a Herring Gull (*Larus argentatus*), a Shag (*Phalacrocorax graculus*), a Common Curlew (*Numenius arquata*), British, presented by Dr. A. Günther, F.R.S.; seven European Phyllodactyles (*Phyllodactylus europæus*) from the Island of Elba, presented by Prof. Giglioli, C.M.Z.S.; a Robben Island Snake (*Coronella phocarum*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Pig-tailed Monkey (*Macacus nemestrinus* ♂) from Java, a Common Curlew (*Numenius arquata*), an Oystercatcher (*Hæmatopus ostralagus*), British, deposited; a River Jack Viper (*Vipera rhinoceros*) from West Africa, seven Short-nosed Sea Horses (*Hippocampus antiquorum*) from the European Coast, purchased.